MICONIA CORDIERI, A NEW SPECIES OF *MICONIA* SECT. *SAGRAEA* (MELASTOMATACEAE) FROM THE MACAYA BIOSPHERE RESERVE, HAITI

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ABSTRACT

A new species of *Miconia* sect. *Sagraea*, endemic to the floristically diverse Massif de la Hotte of southwestern Haiti and discovered during the course of a systematic revision of the Caribbean species of this section, is described and illustrated. The discovery of **Miconia cordieri** brings to 15 the number of described species of *Miconia* sect. *Sagraea* known from the Morne Formon-Pic Macaya region of the Massif de la Hotte, nine of which are endemic to the Massif de la Hotte.

KEY WORDS: Haiti, Macaya Biosphere Reserve, Massif de la Hotte, Melastomataceae, *Miconia*, *Sagraea*

RESUMEN

Se describe e ilustra una especie nueva de *Miconia* sect. *Sagraea*, que es endémica del floristicamente diverso Macizo de la Hotte, localizado al suroeste de Haití. Esta especie fue descubierta en el transcurso de la revisión sistemática de las especies caribeñas de esta sección. El descubrimiento de **Miconia cordieri** eleva a 15 el número de especies descritas en *Miconia* sect. *Sagraea* conocida de la región de Morne Formon-Pic Macaya del Macizo de la Hotte, nueve de las cuales, son endémicas de este Macizo.

PALABRAS CLAVES: Haití, Reserva de la Biosfera Macaya, Masizo de la Hotte, Melastomataceae, *Miconia*, *Sagraea*

While conducting a systematic revision of the Caribbean species of *Miconia* Ruiz & Pavon section *Sagraea* (DC.) Ionta, Judd & Skean, two specimens collected in 1984 and 1989 in the Parc National Pic Macaya, Massif de la Hotte, Haiti and identified as *Ossaea curvipila* Urb. & Ekman (*Miconia curvipila* (Urb. & Ekman) Ionta, Judd & Skean) were examined and determined to represent an undescribed species in the section. Species of *Miconia* sect. *Sagraea* are easily differentiated from other *Miconia* species by their axillary, four-merous flowers with well-developed calyx teeth (Judd 1986a, 1989), and the presence of minute, subsessile to short-stalked, furrowed gland-headed hairs on vegetative surfaces (Ionta et al. 2012). Until recently *Sagraea* was recognized as a genus within Miconieae (Judd 1989; Liogier 2000) or treated as a section within *Clidemia* (Cogniaux 1891). A number of recent phylogenetic analyses (Michelangeli et al. 2004, 2008; Goldenberg et al. 2008; Martin et al. 2008) confirmed the monophyly of *Sagraea*, but at the same time revealed that nearly all of the genera of Miconieae, including *Miconia*, itself, are polyphyletic (Michelangeli et al. 2004, 2008; Goldenberg et al. 2008; Becquér-Granados et al. 2008; Martin et al. 2008). The most plausible solution to this classificatory problem (as clearly evident in Figs. 1–3 of Goldenberg et al. 2008, or Fig. 1 of Michelangeli et al. 2008) is to place most species of Miconieae (including *Sagraea* species) within a greatly expanded *Miconia*, comprising the molecular-supported clade within Miconieae that can be diagnosed by the synapomorphy of berry fruits (Ionta et al. 2012). Thus we describe this new species as *Miconia cordieri*.

Miconia cordieri is morphologically most similar to the la Hotte endemic *M. woodsii* (Judd & Skean) Ionta, Judd & Skean, and to a complex of species that includes the la Hotte endemics *M. curvipila*, *M. lanceifolia* (Urb.) Ionta, Judd & Skean, *M. rubisetulosa* Ionta, Judd & Skean, and the Hispaniolan endemic *M. ellipsoidea* (Urb. & Ekman) Ionta, Judd & Skean; species delimitations and relationships within this "*M. ellipsoidea*" species complex are being investigated by the first author, and a consideration of these delimitations is beyond the scope of this paper. *Miconia cordieri*, *M. woodsii*, and the members of the *M. ellipsoidea* complex have a number of features in common, most notably the presence of minute, subsessile to short-stalked pseudopeltate hairs with flattened branches on abaxial leaf surfaces, which are likely homologous to the short-stalked, furrowed gland-

headed hairs typical of (and putatively synapomorphic for) most other species of *Miconia* sect. *Sagraea*. These distinctive, flattened hairs are also present in a group of related species (differentiated from the previously mentioned species by their square, winged stems) that includes *M. hottensis* Ionta, Judd & Skean, *M. navifolia* Ionta, Judd & Skean, *M. capillaris* (Sw.) M. Gomez (the hairs peltate in *M. capillaris*), and *M. tetraptera* (Cogn.) Ionta, Judd & Skean (Ionta et al. 2012), and may prove to be synapomorphic for this entire group of species.

Miconia cordieri, exhibiting a distinctive combination of morphological characters, satisfies the definitions of the morphological-phenetic (Judd 2007) and diagnostic (Wheeler & Platnick 2000) species concepts. The most distinctive feature differentiating *Miconia cordieri* from *M. woodsii* and from species in the *M. ellipsoidea* complex is the presence of simple, erect, multiseriate hairs (0.1–0.3 mm long) scattered sparsely on the veins and on the abaxial leaf lamina (arising from veinlets). Simple hairs are absent from the abaxial leaf surfaces of *M. woodsii*, and in the species of the *M. ellipsoidea* complex they are present only on quaternary veins and higher, and the hairs tend to be longer (e.g., from 0.3–0.7 mm long in *M. ellipsoidea*, and to 1.3 mm long in *M. rubisetulosa*) and more densely distributed. The pattern of simple hairs on the stems of these plants mirrors that of the abaxial leaves, i.e., simple stem hairs are absent in *M. woodsii*, short erect hairs are scattered on the stems of *M. cordieri*, and more densely distributed, longer hairs are typical of species in the *M. ellipsoidea* complex. Dendritic hairs, which are present on the stems of many species of *Miconia* sect. *Sagraea*, can be diagnostically important. The stems of *M. cordieri* and *M. woodsii* are densely covered with sessile to stalked globular dendritic hairs (to 0.2 mm long in *M. cordieri*, to 0.1 mm long in *M. woodsii*); these hairs are also scattered on the major abaxial veins, particularly along the midvein adjacent to the petiole. Dendritic hairs on the stems of species in the *M. ellipsoidea* complex are more sparsely arranged than in *M. cordieri* and *M. woodsii*, and tend to be sessile to very short-stalked (occasionally to 0.1 mm long in *M. rubisetulosa*).

The leaves of *Miconia cordieri* are morphologically similar to those of *M. woodsii* and species in the *M. ellipsoidea* complex. In these species, the leaves are more or less elliptic (often elongate to narrowly ovate in some species), bullate (to varying degrees within and among species), with scattered, stiff setae on the adaxial surface, serrulate margins, and adaxial surfaces that tend to turn dark maroon when dry. In *M. cordieri* and species in the *M. ellipsoidea* complex, abaxially raised percurrent intertertiary veins are common. In *M. woodsii*, percurrent intertertiary veins are uncommon, and when they occur they are indistinct and not raised abaxially.

Inflorescence morphology of *Miconia cordieri* is similar to that of *M. woodsii* and most species in the *M. ellipsoidea* complex from the la Hotte region, i.e., few-flowered, compact inflorescences (e.g., up to 5 flowers in inflorescences up to 4.5 mm long in *M. cordieri*, and 7 flowers in inflorescences up to 8 mm long in *M. woodsii*), the exception being *M. rubisetulosa*, which has up to 12 flowers in longer, less compact inflorescences to 24 mm long. Floral traits that differentiate *M. cordieri* and *M. woodsii* from species in the *M. ellipsoidea* complex include hypanthium shape and size (± cylindrical, flaring distally, and to 1.6 mm long in *M. cordieri* and *M. woodsii*, vs. urceolate and to 2.5 mm long in members of *M. ellipsoidea* complex), indumentum (low warty projections present on proximal half of hypanthium in *M. ellipsiodea* complex are absent in *M. cordieri* and *M. woodsii*), and ornamentation of the inner hypanthium surface and the lower rim of hypanthium tube (the lower rim in *M. cordieri* and *M. woodsii* appearing scalloped, with 8 low triangular projections corresponding to the insertion points of the stamens and extending down the inner hypanthium and forming low ridges, and the lower rim of the hypanthium tube ringed with a fringe of inwardly-oriented hairs, vs. inner hypanthium surface and rim glabrous, smooth, and un-ornamented in species of the *M. ellipsoidea* complex).

Other floral features distinguishing *Miconia cordieri* from *M. woodsii* include the presence of stout, conical, somewhat curved hairs to 0.3 mm long on the hypanthium (absent in *M. woodsii*, and multiseriate hairs of species of *M. ellipsoidea* complex longer and thinner, and not conical, when present), elongate, gland-tipped hypanthium hairs (absent in *M. woodsii*, but common in species in the *M. ellipsoidea* complex), and ovary position (½ inferior in *M. cordieri*, ⅔ inferior in *M. woodsii*, and mostly inferior, except for the collar, in other species, but we note that data are based on only ten collections, and ovary position tends to vary infraspecifically in *Miconia*).

Morne Formon, Morne Macaya, and the Gran Ravine du Sud comprise the core area of the Macaya

Biosphere Reserve (Sergile et al. 1992; Woods & Ottenwalder 1992), an extraordinary area of species endemism in the Massif de la Hotte (Haiti) that continues to yield new angiosperm species (see Ackerman & Whitten 2010; Judd et al. 2008). *Miconia cordieri* is known only from a few isolated fragments of original vegetation in cut-over moist broadleaved forests (i.e., *rak bwa)* on rough "dog-tooth" limestone at the southern base of Morne Formon, from 950 to1190 m on the ridge just below (south) of Ville Formon and between Ville Formon and the "Experiment Station" on the Deron Plain (west-northwest of Formon). For a detailed map showing the locations of Morne Formon, the Deron Plain, and the karstic ridge just S of Ville Formon see Woods & Harris (1986, Map 4). The vegetation of the Formon region (sometimes spelled Formond) is described in Ekman (1928), Judd (1987) and Judd et al. (1990, 1998).

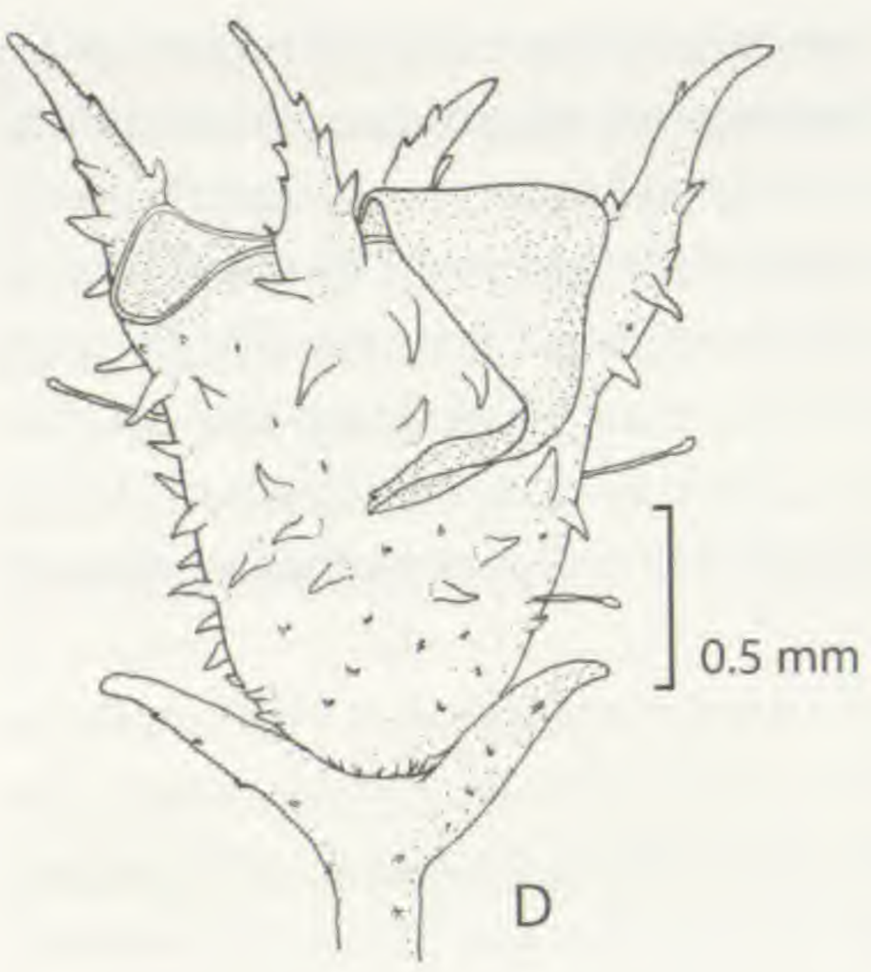
The Massif de la Hotte, the westernmost mountain range on the Tiburon peninsula of Haiti, harbors many interesting species of Melastomataceae (see Judd 2007; Skean 1993). Other melastomes occurring in the vicinity include *Calycogonium apiculatum* Urb. & Ekman, *C. formonense* Judd, Skean & Clase, *C. torbecianum* Urb. & Ekman, *Clidemia umbellata* (Mill.) L. O. Williams, *Mecranium birimosum* (Naudin) Triana, *M. haitiense* Urb., *M. revolutum* Skean & Judd, *Meriania brevipedunculata* Judd & Skean, *Miconia pyramidalis* (Desr.) DC., *M. rubrisetulosa*, *M. subcompressa* Urb., *M. tetrastoma* Naud., and *Tibouchina longifolia* (Vahl.) Baill. ex Cogn.

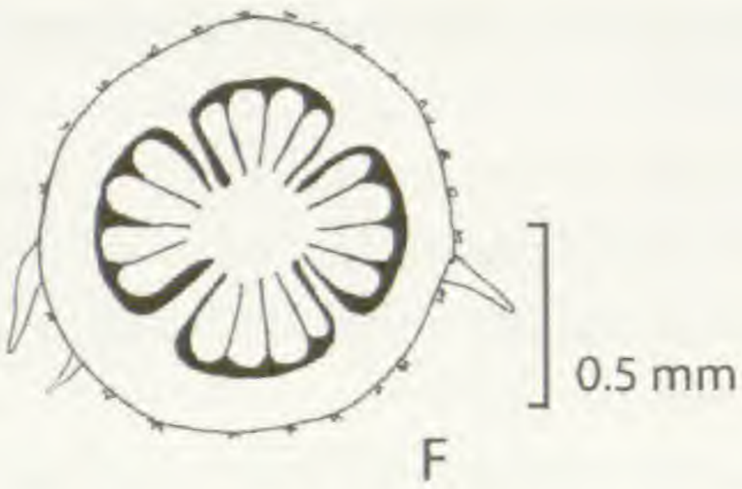
The discovery of *Miconia cordieri* brings to 15 the number of described species of *Miconia* sect. *Sagraea* known from the Morne Formon-Pic Macaya region of the Massif de la Hotte (see Ionta et al. 2012). Of these species, 10 are endemic to Hispaniola, and nine are endemic to the Massif de la Hotte.

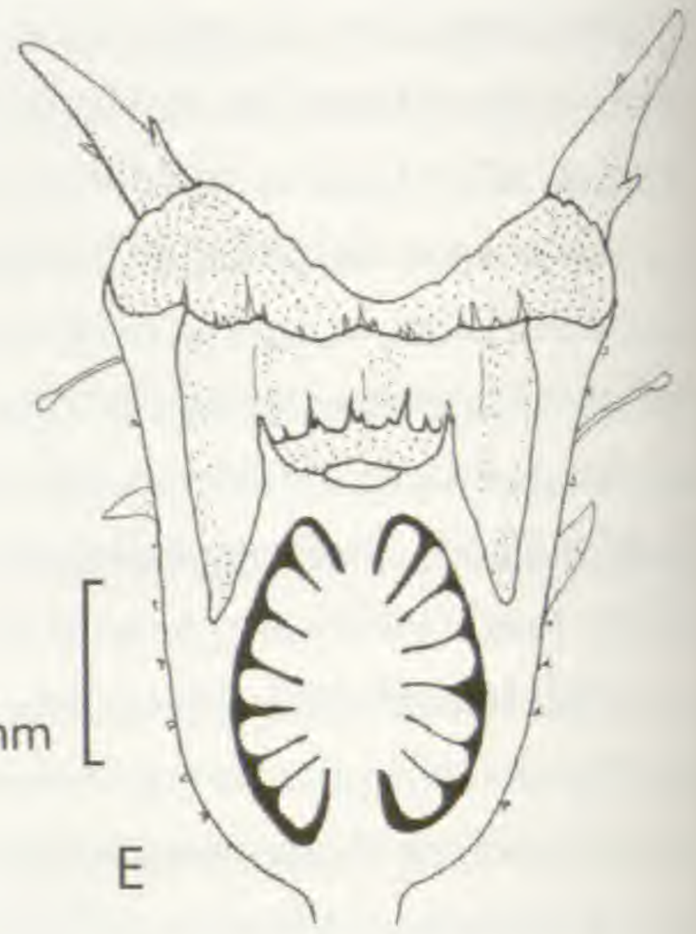
Miconia cordieri Ionta & Judd, sp. nov. (**Figs. 1–2**). TYPE: HAITI. DEPARTEMENT DU SUD: Massif de la Hotte, between Ville Formon and «Experiment Station» on Deron Plain, 1170–1190 m, 14 Nov 1989, *W. Judd 5859* (HOLOTYPE: FLAS!; ISOTYPES: FLAS!, EHH!).

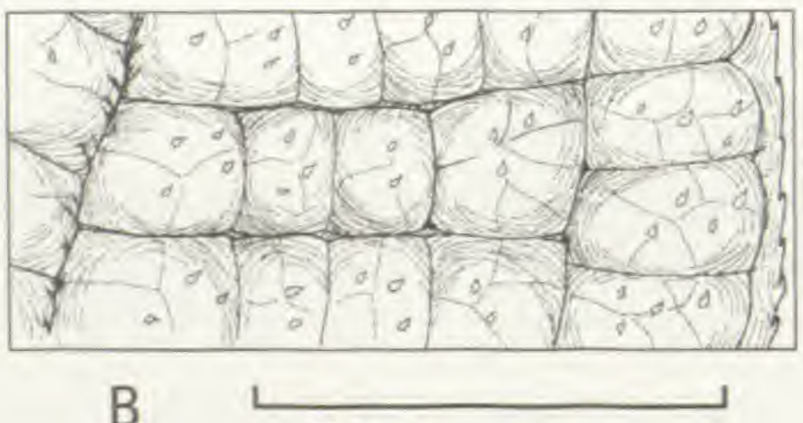
Species haec ab *Miconia woodsii* (Judd & Skean) Ionta, Judd & Skean differ trichomatibus foliorum simplicibus, multicellulis, eglanduliferis, erectis, 0.1–0.3 mm longis, in veins et pagina abaxiali (non absentibus); trichomatibus caulium similaribus (non absentibus); trichomatibus hypanthii simplicibus, multicellulis, eglanduliferis, conicis, ± curvis, ad 0.3 mm longa et glanduliferis, elongatis, ad 0.6 mm longa (non utrinque absentibus); inflorescentiis ad 4.5 mm (non ad 8 mm) longas; ovario ½ infero (non ⅔ infero).

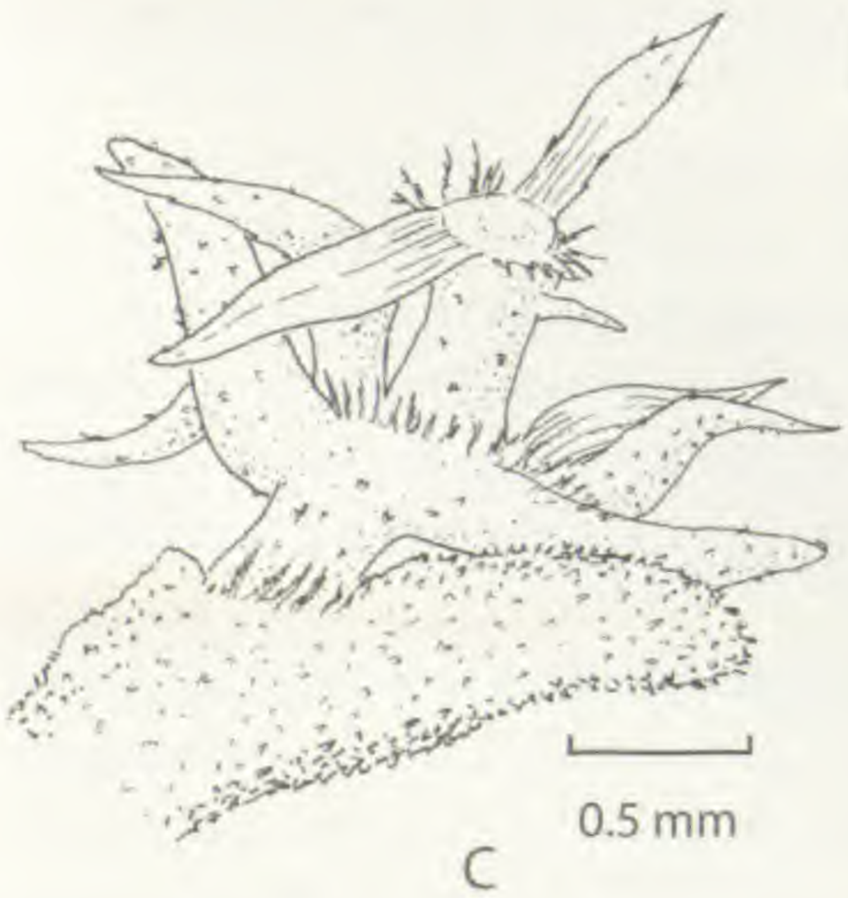
Shrub to 1.5 m tall. Indumentum of minute, multicellular, subsessile pseudopeltate globular-dendritic hairs with flattened and coalesced branches, multicellular, sessile to stalked elongate-dendritic hairs to 0.6 mm long, simple, erect, multiseriate hairs to 0.4 mm long, and broad based, curved, simple, multiseriate hairs from 0.1–0.2(–0.3) mm long. Young twigs to 2.2 mm wide, rounded-quadrangular in cross section, becoming terete with age, the young stems densely pubescent, with sessile to stalked, globular-dendritic hairs to 0.2mm long (occasionally to 0.3 mm long in interpetiolar regions), and scattered, simple, erect, multiseriate hairs to 0.4 mm long, the stems becoming glabrous with age; internodes 0.6–6.5 cm long. Leaves with petiole 1.5–9.3 mm long, ± rounded-triangulate, with hairs similar to those of the stem, elongate-dendritic hairs to 0.6 mm long often present adaxially, the petiole hairs persistent; blade 1.3–5.7 cm long, 0.7–2.7 cm wide, leaf pairs occasionally slightly to moderately anisophyllous, the blades elliptic, falcate, with discrete areas bounded by adjacent tertiary and quaternary veins adaxially convex, thus the leaves often bullate, the blade coriaceous, the apex acute, ± straight to slightly acuminate, culminating with a small, blunt mucro, the base ± symmetric, obtuse to rounded to slightly cordate, the margin plane, serrulate; largest teeth to ca. 0.2 mm, hairs on teeth incurved, to ca. 0.5 mm long; venation acrodromous, basal, with prominent midvein and 4 secondary veins, 2 conspicuous secondary veins positioned 1.1–4 mm from margin, and 2 inconspicuous secondary veins 0.1–0.4 mm from margin, numerous percurrent tertiary veins oriented sub-perpendicular to midvein and 0.9–3 mm apart, percurrent quaternary veins common, the higher order veins orthogonal-reticulate; adaxial surface glossy green (dark maroon when dried), initially with scattered minute, subsessile, pseudopeltate globular-dendritic hairs with flattened and coalesced branches, but these soon shed, elongate dendritic hairs (to 0.6 mm long) common at midvein particularly towards the leaf base and scattered on secondary and tertiary veins, and with broad-based, curved, simple, multiseriate hairs from 0.1–0.2 (–0.3) mm long, clustered in groups of one to six in the center of convex areas bounded by tertiary and percurrent quaternary veins, the midvein, major secondary and tertiary veins strongly to only slightly impressed, the percurrent quaternary veins moderately to slightly im-











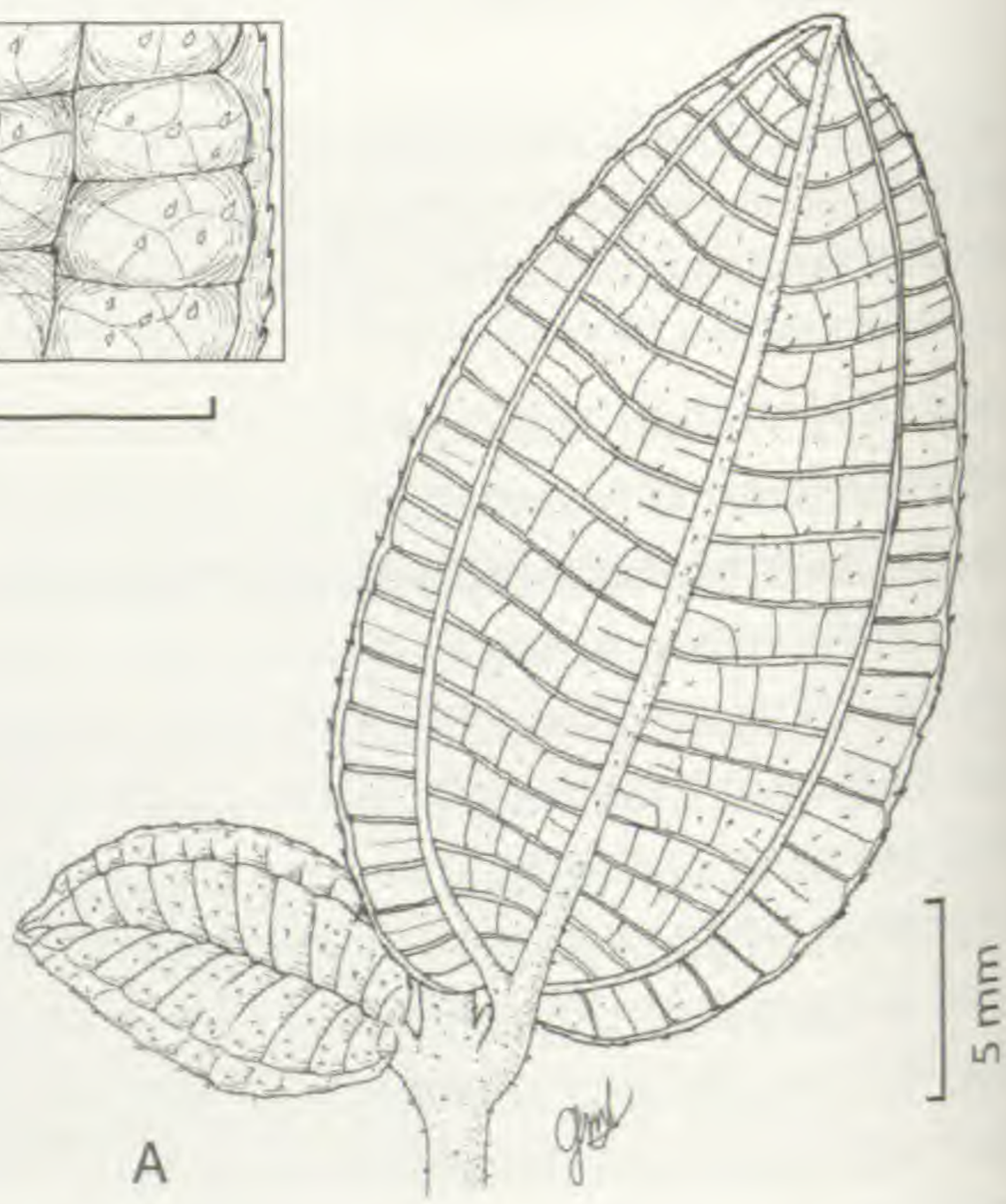


Fig. 1. *Miconia cordieri*. A. Abaxial and adaxial leaves. B. Detail of adaxial leaf surface. C. Inflorescence, flowers removed. D. Hypanthium, with one petal. E. Flower, longitudinal section. F. Ovary, cross-section.

pressed, the surface smooth; the abaxial surface pale green (brownish-green when dry), with scattered, simple, erect, multiseriate hairs to 0.3 mm long on midvein, secondary to quaternary veins, and even on lamina, where they originate from veinlets, and minute, scattered subsessile, pseudopeltate hairs with fused, flattened branches, and sessile to short-stalked dendritic hairs to 0.1 mm long restricted to quaternary and higher order veins, the midvein strongly raised, the major secondary and tertiary veins moderately raised, and the percurrent quaternary veins slightly raised, the higher order veins ± flat. Inflorescences axillary, in one or both axils of leafy nodes, occasionally more than one inflorescence per axil; glomerate cymes with up to 5 flowers, lacking major branch-pairs, ca. 4.5 mm long, 3 mm wide, inflorescence branch segments to 0.9 mm, the ultimate

FIG. 2. *Miconia cordieri*. Branch, showing curved and strongly bullate leaves. From the holotype.

branches (pseudopedicels) to 0.5 mm long, inflorescence branches sparsely pubescent with minute globular-dendritic hairs and occasional, simple, erect, multiseriate hairs to 0.4 mm long; peduncle to 1.2 mm long, with similar indumentum, occasionally with an additional pair of bracts mid-peduncle, the mid-peduncle bracts early deciduous, narrowly triangular, to 1.5 mm long, 0.5 mm wide, the mid-peduncle bracts and subtending peduncle segment densely pubescent, with globular dendritic hairs similar to stem hairs; each inflorescence branch associated with a pair of persistent, narrowly triangular, linear bracts, 0.6–1 mm long, 0.3–0.5 mm wide, the bracts with globular-dendritic hairs similar to those of inflorescence branches abaxially and glabrous adaxially, and with sparse elongate-dendritic hairs to 0.3 mm long along nodal region between bract-pairs; each flower subtended by 2 persistent, narrowly triangular to linear bracteoles to 1 mm long, ca. 0.3 mm wide, with sparse hairs similar to those of inflorescence branches abaxially, glabrous adaxially, the apices acute. Flowers in dichasia, pedicels absent to 0.1 mm long. Hypanthium ± cylindrical, slightly flaring distally, 1.5–1.6 mm long, free portion ca. 1 mm long, the outer surface with scattered sessile to sub-sessile, globular-stellate hairs, scattered, minute globular to elliptic dark brown glands, simple, erect, multiseriate gland-headed hairs to 0.6 mm long, and simple, erect, stout conical hairs to 0.3 mm long, the inner surface glabrous. Calyx lobes 4, at anthesis 0.3–0.4 mm long, 1.1–1.3 mm wide, broadly triangular to rounded, the outer surface with hairs similar to hypanthium, the inner surface glabrous, the apex rounded to slightly acuminate, the margin entire to slightly erose; calyx teeth 4, 0.9–1.2 mm long, 0.15–0.2 mm wide, narrowly triangular with a ± terete distal portion, with an acute apex, hairs similar to those of hypanthium; the calyx tube ca. 0.1 mm long, inner surface glabrous, the lower rim appearing scalloped, with 8 low triangular projections corresponding to the insertion points of the stamens, and ringed with a fringe of inwardly-oriented hairs to 0.1 mm long. Petals 4, ca. 2 mm long, 0.4–0.5 mm wide, narrowly triangular, glabrous, the apex acute, slightly cupped, with or without a minute abaxial projection, the margin entire. Stamens 8, not seen. Ovary 4-loculate, ½ inferior, ovoid to narrowly ovoid, 1.2–1.4 mm long, 1.1–1.2 mm wide, with cylindrical apical collar encircling style, 8-lobed and distinctly ridged, with a crown of fine hairs to 0.1 mm long at the lobe apices; style and stigma not seen. Placentation axile; ovules numerous. Fruits not seen, presumably globose, blue berries.

Distribution and Ecology.—*Miconia cordieri* is endemic to Bwa Formon and Bwa Deron, on the high plateau with karstic hills south of Morne Formon in the Massif de la Hotte, growing at 950–1200 m. The two collections of this rare species were found growing in disturbed moist broadleaved forests on limestone.

Phenology.—The flowering period is poorly known and has been documented only in November.

Etymology.—The specific epithet refers to Dan and Tia Cordier, in acknowledgment of their important logistical assistance during W. S. Judd's 1984 fieldwork in the Massif de la Hotte, which resulted in the first collection of this species. Without their critical support, this fieldtrip and the subsequent trip to the same region by J.D. Skean, Jr. (then a graduate student working under the direction of W. S. Judd) would not have been possible. These two trips resulted in the discovery of 12 angiosperm species (and one subspecies) new to science (see Guerrero et al. 2004; Judd 1986b, c; Judd & Skean 1987a, b; 1993; Judd et al. 2008; Skean 1993, 2000; Skean & Judd 1986, 1988a, b) and facilitated the documentation of the diverse flora of this region (Judd 1987).

Additional Specimen Examined: **HAITI. Departement du Sud:** Macaya Biosphere Reserve, Massif de la Hotte, Bois Formon, S of village of Formon, S of Morne Formon, 950–1040 m, 23 Jan 1984, *W. Judd & D. Dod 3469* (FLAS, EHH, NY).

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